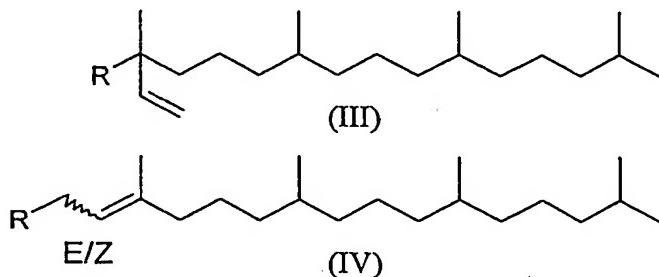


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## **Claims**

1. A process for the manufacture of  $\alpha$ -tocopheryl acetate which comprises reacting 2,3,6-trimethylhydroquinone-1-acetate with a compound selected from the group consisting of phytol (formula IV with R = OH), isophytol (formula III with R = OH), and (iso)-phytol derivatives represented by the following formulae III and IV with R = C<sub>2-5</sub>-alkanoyloxy, benzoyloxy, mesyloxy, benzenesulfonyloxy or tosyloxy,



10 in the presence of a catalyst of the formula  $M^{n+}(R^1SO_3^-)_n$ , wherein  $M^{n+}$  is a silver, copper, gallium, hafnium or rare earth metal cation, n is the valence of the cation  $M^{n+}$ , and  $R^1$  is fluorine, perfluorinated  $C_{1-8}$ -alkyl or perfluorinated aryl, and, if required, cyclizing any 3-phytyl-2,5,6-trimethylhydroquinone-1-acetate or a double bond isomer thereof obtained as an intermediate reaction product, to produce  $\alpha$ -tocopheryl acetate.

- 15 2. The process as in claim 1, wherein in the catalyst  $M^{n+}$  is  $Ag^+$ ,  $Cu^+$ ,  $Ga^{3+}$ ,  $Sc^{3+}$ ,  $Lu^{3+}$ ,  
 $Ho^{3+}$ ,  $Tm^{3+}$ ,  $Yb^{3+}$  or  $Hf^{4+}$ .

3. The process as in claim 1, wherein in the catalyst  $M^{n+}$  is  $Ag^+$ ,  $Ga^{3+}$ ,  $Sc^{3+}$  or  $Hf^{4+}$ .

20 4. The process as in any one of claims 1 to 3, wherein in the catalyst  $R^1$  is trifluoromethyl.

5. The process as in any one of claims 1 to 4, wherein the catalyst is used in a relative amount of from about 0.001 mol% to about 1 mol%, based on 2,3,6-trimethylhydroquinone-1-acetate or a compound represented by formula III or IV, whichever is used in the lesser molar amount.

25 6. The process as in any one of claims 1 to 5, wherein 2,3,6-trimethylhydroquinone-1-acetate is reacted with phytol and/or isophytol, preferably with phytol, and, if required, any 3-phytyl-2,5,6-trimethylhydroquinone-1-acetate or a double bond isomer thereof obtained as an intermediate reaction product is cyclized, to produce  $\alpha$ -tocopheryl acetate.

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7. The process as in any one of claims 1 to 6, wherein the process is carried out in an aprotic non-polar or an aprotic polar organic solvent.
- 5 8. The process as in any one of claims 1 to 6, wherein the process is carried out in a biphasic solvent system of a polar solvent and a non-polar solvent.
- 10 9. The process as in claim 8, wherein the polar solvent is selected from the group consisting of aliphatic and cyclic carbonates, aliphatic esters and cyclic esters, aliphatic and cyclic ketones, and mixtures thereof, and the non-polar solvent is selected from the group consisting of aliphatic hydrocarbons and aromatic hydrocarbons.
- 15 10. The process as in claim 9, wherein the polar solvent is at least a cyclic carbonate, and the non-polar solvent is at least a linear, branched or cyclic C<sub>5</sub>- to C<sub>15</sub>-alkane.
- 15 11. The process as in claim 10, wherein the polar solvent is ethylene carbonate or propylene carbonate or a mixture thereof, preferably ethylene carbonate, and the non-polar solvent is hexane, heptane, octane, cyclohexane or methylcyclohexane or a mixture thereof, preferably heptane.
- 20 12. The process as in claims 7 to 11, wherein from about 0.25 ml to about 6 ml, preferably from about 0.5 ml to about 3 ml, of an organic solvent are used per mmol of the compound represented by formula III or IV, whichever is employed, these amounts referring to the total amount of solvent, i.e. regardless of whether the reaction is effected in a single phase (non-polar organic solvent or polar organic solvent) or in a biphasic solvent system (non-polar organic solvent and polar organic solvent).
- 25 13. The process as in any one of claims 8 to 11, wherein the volume ratio of the non-polar solvent to the polar solvent in the biphasic solvent system is in the range from about 1 : 5 to about 30 : 1, preferably from about 1 : 3 to about 20 : 1, especially from about 10 : 1 to about 15 : 1.
- 30 14. The process as in any one of claims 1 to 13, wherein the molar ratio of 2,3,6-trimethylhydroquinone-1-acetate to the compound represented by formula III or IV present in the reaction mixture is from about 3 : 1 to about 0.8 : 1, preferably from about 2 : 1 to about 1 : 1, more preferably from about 1.75 : 1 to about 1 : 1.

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15. The process as in any one of claims 1 to 14, wherein the reaction is carried out at temperatures from about 20°C to about 160°C, preferably from about 80°C to about 150°C, especially from about 105°C to about 150°C, most preferably from about 125°C to about 145°C.

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16. The process as in claim 1, wherein 2,3,6-trimethylhydroquinone-1-acetate is reacted with isophytol or phytol in the presence of a catalyst of the formula  $M^{n+}(R^1SO_3^-)_n$ , wherein  $M^{n+}$  is a silver, copper, gallium, hafnium or rare earth metal cation, n is the valence of the cation  $M^{n+}$ , and  $R^1$  is fluorine, C<sub>1-8</sub>-perfluoroalkyl or perfluoroaryl, in an aprotic organic solvent, and, if required, any 3-phytyl-2,5,6-trimethylhydroquinone-1-acetate or a double bond isomer thereof obtained as an intermediate reaction product is cyclized to produce  $\alpha$ -tocopheryl acetate.

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